

July 23, 2001

MEMORANDUM TO: Ashok C. Thadani, Director  
Office of Nuclear Regulatory Research

FROM: Thomas L. King, Director **/RA/**  
Division of Risk Analysis and Applications  
Office of Nuclear Regulatory Research

SUBJECT: MEETING WITH EXELON GENERATION COMPANY, DOE AND  
OTHER INTERESTED STAKEHOLDERS REGARDING THE PEBBLE  
BED MODULAR REACTOR

On June 12 and 13, 2001, the Nuclear Regulatory Commission (NRC) staff held a day-and-half meeting with the representatives of Exelon, Department of Energy (DOE), and other interested stakeholders to discuss the Pebble Bed Modular Reactor (PBMR) pre-application review efforts. As agreed at the April 30, 2001, meeting, this meeting was the second one in a series of planned monthly topical meetings to be conducted between the NRC staff, Exelon and DOE during the course of a year.

Attachment 1 contains the meeting agenda. Attachment 2-a and 2-b contain a list of attendees for each day. The Exelon presentation material is included in Attachments 3-a and 3-b. Additionally, Working Draft A of a discussion paper titled, "Top Level Regulatory Criteria," submitted by Exelon, is included as Attachment 4. On the second day, in a closed session, Exelon discussed proprietary information. The presentation material used in this session is not being released to the public; however, Attachment 5-a contains two pages from a German text<sup>1</sup> that was used by the NRC staff during discussion. Attachment 5-b contains details of staff's comments on pertinent discussion.

The staff's objectives of this meeting were to gather sufficient information to adequately analyze and evaluate and provide feedback on the specific PBMR-related proposals and issues. It was emphasized that in many cases, resolution of various issues will require Commission policy decisions.

The staff explicitly stated its expectation that after each meeting Exelon will fully document and formally submit all of the information that had been presented orally and informally at various meetings. A formal follow up submittal is necessary for the staff to review these proposals. For example, the information and the proposals that were presented and discussed by Exelon at

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<sup>1</sup>"AVR - 20 Jahre Betrieb" (AVR - 20 Years of Operation) (VDI Berichte 729, VDI Verlag, 1989)

the April 30<sup>th</sup> meeting were subsequently formally documented and submitted by Exelon in its letters to the Commission, dated May 10, May 25, and June 1, 2001.

On June 12<sup>th</sup>, in his opening remarks, Stuart Rubin (NRC) stated that the main objective of the PBMR pre-application review process is to develop and feedback to Exelon NRC guidance concerning significant issues related to the siting, construction and licensing of a PBMR in the US. The staff's goal is to develop a road map of both the general regulatory criteria that would need to be met, and the significant design requirements and technology demonstrations that would need to be satisfied as part of a PBMR licensing application. Specifically, Exelon has requested feedback on their licensing approach, the regulatory processes for obtaining early site permits and a combined operating license; and the legal and financial obligations that would have to be met by a potential PBMR licensee. The staff stated that discussions of each of these topics would require several meetings before it is able to formulate its positions and provide formal feedback.

Kevin Borton (Exelon) lead the discussion on PBMR licensing issues. Attachment 3-a contains the presentation material. Exelon discussed their top-down, risk-informed (R-I) PBMR licensing approach by comparing it with the corresponding NEI initiative and also with NRC's Advanced Reactor Policy Statement, Safety Goals and other guidance. Eric Benner et al. (NRC) discussed specific issues raised at the April 30<sup>th</sup> meeting with Exelon and DOE, and responded to Exelon's request for feedback. Attachment 6 contains staff's preliminary evaluation of Exelon's proposal for use of R-I licensing approach.

Diane Jackson et al. (NRC) discussed the nine white papers submitted by Exelon in May 2001. These papers addressed Exelon concerns related to the existing NRC requirements on subjects such as, number of licenses, financial protection, decommissioning funding, antitrust review, annual fees, operator staffing, minimum decommissioning costs, fuel cycle impacts, and financial qualifications. Following extensive discussion on various subjects and Exelon's concerns, open items for staff and Exelon were identified. Attachment 7 contains details on each of these papers.

In its letter of May 25, 2001, Exelon requested the NRC's views on its proposed licensing sequence for the PBMR, proposed durations and schedules, and the assumptions that frame the NRC's views. Jerry Wilson (NRC) stated that the proposed sequence for licensing the PBMR under Part 52 (Early Site Permit first, then Combined License (COL), and, finally, Design Certification) is conceptually acceptable, but he had several comments on Exelon's approach, i.e. (1) completeness of the COL application, (2) implementation of the inspections, tests, analyses, and acceptance criteria for a multi-reactor COL, and (3) need for and timing of testing to support the COL application.

On June 13<sup>th</sup>, Vijay Nilekani (Exelon) and Gregory Storey (Exelon), with Dr. Johan Venter (PBMR. Pty, Republic of South Africa [RSA]) via teleconferencing, presented an overview on the development in Germany and the RSA. Fuel design, manufacturing, quality control and qualification issues were addressed. Specific areas discussed at this meeting were: PBMR fuel equivalence plan; RSA fuel fabrication facility qualification; overview of fuel manufacturing process and quality control, including techniques to assess failed coated particle fraction in fuel and the relevant German AVR fuel performances; fuel qualification and testing; core condition monitoring; pebble flow testing; burn-up measurement; and bounding design-basis events. The first part of their presentation was open to the public; however, the second half was a closed session to discuss proprietary information. Attachment 3-b contains the non-proprietary information presented by Exelon.

Exelon proposed the following dates for three 2-day topical meetings in the near future: (1) July 17 and 18 to continue discussions on PBMR licensing approach as well as fuel performance and qualification, and provide an overview of the Codes and Standards to be used; (2) August 14 and 15 to continue discussions on licensing approach, fuel performance, and qualification as well as the Codes and Standards to be used, and to provide an overview of analytical codes to be used; and (3) September 19 and 20 to close out discussions on licensing approach and fuel performance, and to continue discussion of codes to be used. The staff will coordinate the meeting schedule with Exelon and the final dates will be announced in a formal meeting notice.

The meeting adjourned at 12:30 p.m. on June 13<sup>th</sup>. Any questions regarding this meeting should be addressed to Stuart Rubin ([SDR1@nrc.gov](mailto:SDR1@nrc.gov)), (301) 415-7480.

Attachments: As stated

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